

PATENT SPECIFICATION



Application Date: June 26, 1941. No. 8029/41.

550,228

Complete Specification Left: July 23, 1942.

Complete Specification Accepted: Dec. 30, 1942.

PROVISIONAL SPECIFICATION

Improvements in Coin-controlled Vending Machines

We, PERCY STEPHEN HARPER, a British subject, and THE HARPER AUTOMATIC MACHINE MANUFACTURING COMPANY LIMITED, a British Company, and both of the Company's address at Automatic Works, Stafford Road, Waddon, Croydon, Surrey, do hereby declare the nature of this invention to be as follows:—

This invention relates to coin-controlled vending machines and has for its object to provide a machine which, upon the insertion of one or a plurality of coins of the same or various denominations, enables the purchase of one or several articles of the same or of different prices, selected from multiple article columns, up to the inserted value of the inserted coins. A further object is to enable, in a machine operating as aforesaid, a speedy re-setting or rearrangement of parts so that the prices of articles in any of the columns may be altered and the machine operate at the new prices.

The said invention is designed for electrical operation, and employs a coin-reception unit, or plurality of the same, which is adapted to receive one or a stack of coins. The insertion of the coin or coins conditions the unit to permit the discharge of an article up to the value of the inserted coins when the customer completes an operating circuit by simply working a press-button or other suitable switch. Such a switch is associated with each column of vendible articles.

According to the invention a coin-reception unit comprises a chute adapted to retain a stack of coins superimposed edgewise and resting on a coin platform at the base thereof. The number of coins which can be accommodated depends upon the vertical space available within the machine and as an example a unit accommodating five will be described. The platform is movable, such as by a pivoted action, and its movement is capable of being brought about by electrical means, e.g. an electromagnet or equivalent; it is normally in its coin-supporting position in the chute, being held there, if necessary, by a light spring.

Spaced along the length of the chute and at intervals equivalent to the diameter

of the coins are a number of electrically operated coin stack supporters. Each of these is furnished with an element adapted to project between each pair of stacked coins to support all coins in the stack located thereabove. For example the projecting element may be the movable spindle of a solenoid. The spindle itself need not necessarily extend into the coin path but could push on a ball housed in a pocket adjacent the coin path; by this means when the solenoid is de-energised a light weight (such as the weight of one coin supported by the ball) will be sufficient to push back the spindle when the coin drops. A light spring, however, may be employed for this purpose.

It will be seen that according to which one of the aforesaid coin stack supporters is operated so will a certain number of coins be held in the chute when the coin or coins underneath the supporter are released by operating the coin platform. Consequently if the electromagnetic means operating the platform is energised simultaneously with a selected stack supporter, the effect will be to release and cut off all coins underneath the supporter. On de-energising, the platform returns into the coin path and the remaining coins drop down on to it.

Each of the bank of coin stack supporter electromagnets is controlled by a master switch in its circuit, and the circuits each includes the platform operating electromagnet. Thus by selecting an appropriate master switch a given number of coins will be released from the coin reception unit. The series of master switches are the customer-operated push-buttons or equivalents associated respectively with the vendible article columns; that is to say, a column marked 2d. (for example) would be aligned or otherwise associated with a switch releasing two (penny) coins. The switch would preferably be of a time lag type so that on actuation, it would "make" for a predetermined time, and then automatically "break."

So far it is seen that operation of the selected master switch by the customer will cut off and release a number of coins corresponding to the particular switch. If

some coins are still left in the coin reception unit, these may be similarly released one or more at a time, by operating the appropriate switch.

5 The circuit containing the master switch and electromagnets also includes an electrically operated ejector device for the particular article column corresponding to the switch, but the circuit is not completed until the appropriate coin or number of coins rest in the coin reception unit. Any suitable means may be incorporated whereby the presence of such coin or coins completes the circuits. For example, 10 throughout the height of the coin reception unit is a bank of switches, one for each coin, and these switches are moved into the On position when a coin is present returning automatically to the Off when the coin is released and no other takes its place. A pivoted mercury switch is suitable for the purpose.

By this means operation of a particular master switch selected by the customer not 25 only cuts off the number of coins which are to be spent on the article, but operates the ejector for that particular article. If no coin is present the ejector circuit remains broken and the ejector mechanism is not 30 energised.

When employing a battery of coin reception units various of the switches according to certain pre-arranged coin values may be wired in series so that coins 35 in more than one unit must be in position to operate a certain ejector. For example, if a master switch controls at 1/6d. article ejector, then a 1/-d. piece and a 6d. piece must have been inserted in their respective 40 clintes before the ejector circuit is complete.

In a very simple embodiment, there may be a plurality of columns of vendible articles, one column being of one price and 45 the others multiples thereof, e.g. five columns carrying goods valued respectively at 1d., 2d., 3d., 4d. and 5d., and the invention enables any column to be operated by inserting an appropriate 50 number of coins of similar denomination

into a single coin reception unit leading from a single slot. The invention also enables the customer to select goods from any two or more columns up to the value of coinage inserted. 55

In another embodiment of the invention, a plurality of coin reception units is employed, each one being adapted to take coins of denominations differing from those taken by others, e.g. one taking one 60 or more shillings, one taking one or more sixpences and so on, and these are employed in conjunction with a plurality of columns of vendible articles which may be differently priced. To give an example 65 of this embodiment of the invention, the coin reception units may be six in number respectively taking a 2/6d. piece, a 2/-d. piece, a 1/-d. piece, a 6d. piece, 5 separate pennies, and a 1/2d., whilst five columns of 70 goods may be exposed for sale respectively valued at, say, 4/6d., 2/11d., 1/7 1/2d., 6d., and 3 1/2d. per article. The invention enables any article to be purchased by inserting in any coin insertion unit or collection 75 of units appropriate coins totalling the price. The 2/11d. article, for example, would be secured by inserting a 2/-d. piece, a 6d. piece, and 5 pennies in their respective units, and the 3 1/2d. article 80 by inserting three pennies in the unit which takes a total up to five pennies, and a halfpenny in the 1/2d. unit.

If the value of articles in a column is changed it is a fairly simple matter to re- 85 set or rearrange the machine to work according to the new order. For this purpose appropriate switches of the banks in the respective coin receptive units are selected according to the total value 90 needed for the article in the particular column and these are re-connected in series with the master switch of that column in order that the electrically-operated discharge mechanism will only work after insertion of the necessary coinage. 95

Dated this 26th day of June, 1941.

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Agent for the Applicants.

COMPLETE SPECIFICATION

Improvements in Coin-controlled Vending Machines

We, PERCY STEPHEN HARPER, a British subject, and THE HARPER AUTOMATIC MACHINE MANUFACTURING COMPANY 100 LIMITED, a British Company, and both of the Company's address at Automatic Works, Stafford Road, Waddon, Croydon, Surrey, do hereby declare the nature of this invention, and in what manner the 105 same is to be performed to be particularly

described and ascertained in and by the following statement:—

This invention relates to coin-controlled vending machines and has for its object to provide a machine which, upon the inser- 110 tion of one or a plurality of coins of the same or various denominations, enables the purchase of one or several articles of the same or of different prices, selected

from multiple article columns, up to the inserted value of the inserted coins. A further object is to enable, in a machine operating as aforesaid, a speedy re-setting or rearrangement of parts so that the prices of articles in any of the columns may be altered and the machine operate at the new prices.

The said invention is designed for electrical operation, and employs a coin-reception unit, or plurality of the same, which is adapted to receive one or a stack of coins. The insertion of the coin or coins conditions the unit to permit the discharge of an article up to the value of the inserted coins when the customer completes an operating circuit by simply working a press-button or other suitable switch. Such a switch is associated with each column of vendible articles.

According to the invention a coin-reception unit comprises a chute adapted to retain a stack of coins superimposed edgewise and resting on a coin platform at the base thereof. The number of coins which can be accommodated depends upon the vertical space available within the machine and as an example a unit accommodating five will be described. The platform is movable, such as by a pivoted action, and its movement is capable of being brought about by electrical means, e.g. an electromagnet or equivalent; it is normally in its coin-supporting position in the chute, being held there, if necessary, by a light spring.

Spaced along the length of the chute and at intervals equivalent to the diameter of the coins are a number of electrically operated coin stack supporters. Each of these is furnished with an element adapted to project between each pair of stacked coins to support all coins in the stack located thereabove. For example the projecting element may be the movable spindle of a solenoid. The spindle itself need not necessarily extend into the coin path but could push on a ball housed in a pocket adjacent the coin path; by this means when the solenoid is de-energised a light weight (such as the weight of one coin supported by the ball) will be sufficient to push back the spindle when the coin drops. A light spring, however, may be employed for this purpose.

It will be seen that according to which one of the aforesaid coin stack supporters is operated so will a certain number of coins be held in the chute when the coin or coins underneath the supporters are released by operating the coin platform. Consequently if the electromagnetic means operating the platform is energised simultaneously with a selected stack supporter, the effect will be to release and

cut off all coins underneath the supporter. On de-energising, the platform returns into the coin path and the remaining coins drop down on to it.

Each of the bank of coin stack supporter electromagnets is controlled by a master switch in its circuit, and the circuits each include the platform operating electromagnet. Thus by selecting an appropriate master switch a given number of coins will be released from the coin reception unit. The series of master switches are the customer-operated push-buttons or equivalents associated respectively with the vendible article columns; that is to say, a column marked 2d. (for example) would be aligned or otherwise associated with a switch releasing two (penny) coins. The switch would preferably be of a time lag type so that on actuation, it would "make" for a predetermined time, and then automatically "break."

So far it is seen that operation of the selected master switch by the customer will cut off and release a number of coins corresponding to the particular switch. If some coins are still left in the coin reception unit, these may be similarly released one or more at a time, by operating the appropriate switch.

The circuit containing the master switch and electromagnets also includes an electrically operated ejector device for the particular article column corresponding to the switch, but the circuit is not completed until the appropriate coin or number of coins rest in the coin reception unit. Any suitable means may be incorporated whereby the presence of such coin or coins completes the circuit. For example, throughout the height of the coin reception unit is a bank of switches, one for each coin, and these switches are moved into the On position when a coin is present returning automatically to the Off when the coin is released and no other takes its place.

The invention is illustrated in the accompanying drawing in which:—

Figure 1 is a front elevation (partly in section) of a coin-reception unit constructed according to the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a fragmentary sectional view of a switch detail referred to later and taken at right angles to Figure 1; and

Figure 5 is a diagram of electrical connections.

In the drawing, 1 is the chute adapted to retain a stack of coins 2 superimposed edgewise and 3 is the coin platform on which the coins rest. The coin platform

is controlled by an electromagnet 4 adapted when energised to attract an armature 5 and to rock the platform about the fulcrum 6 so as to move the edge of the platform out of the way of the coins in the chute and allow them to fall into a suitable receptacle (not shown) provided to receive them. A spring 7 is arranged to return the coin platform to the coin supporting position when the electromagnet 4 is de-energised.

Two electrically operated coin stack supporters are shown in the drawing, each of these devices being furnished with an element 8 (Figure 2) adapted to project into the space between two of the coins 2. In the construction shown in the drawing, each element 8 takes the form of a ball housed in a pocket 9 adjacent the coin path and controlled by a spindle 10 operated by an armature 10a arranged to be attracted by an electromagnet 11. When the magnet is de-energised, the weight of a coin is sufficient to push the ball 8 aside. When the electromagnet is energised, however, the ball is pushed inwards by the spindle 10 so that any coin or coins above the level of the ball 8 are prevented from dropping.

The coin operated switches (see Figures 1 and 4) which are closed when coins are present in the chute are marked 25 in the drawings. Each of these switches comprises a light rock-shaft 12 carrying a feeler arm 13 located in the coin chute in such a position as to be engaged and pushed aside by the edges of coins resting in the coin chute in the manner shown in Figure 1 of the drawing. As shown in this Figure, there is one rock-shaft 12 arranged to be operated by a coin resting on the platform 3 and a second rock-shaft 12 adapted to be operated by a coin next above that which operates the first-mentioned rock-shaft 12, and so on, one for each coin position, but only two are shown.

Each of the rock-shafts 12 carries an electrically insulating member 13a to which is attached a two-armed electrode 14 adapted to dip into a pair of mercury wells 15 fitted with permanently submerged electrodes 16 which form the terminals of the switch. Each rock-shaft 12 is controlled by a counter-weight 17 tending to rock the shaft 12 in the direction to lift the electrode 14 out of the mercury wells so that when no coins are present the electrical connection between the terminals 16 is broken. The pressure of a coin on the arm 13 rocks the shaft 12 against the action of the weight 17 and causes the two-armed electrode to dip into the mercury wells so as to form a connecting bridge between them.

In the circuit diagram (Figure 5), two

master switches 18 are shown each of these master switches being connected through a particular stack supporter electromagnet 10 to the platform operating magnet 4 so that by selecting the appropriate master switch 18, a given number of coins will be released from the coin selection unit. Each master switch is also connected to an electromagnetic goods ejecting or releasing device 20 for the particular article column corresponding to the switch. In order to prevent operation of the machine unless a sufficient number of coins are present in the reception unit, the circuit of each switch 18 includes one or more of the coin-operated switches 25 according to the number of coins required. In the drawing only two master switches 18 have been shown. These may be arranged for example so that one operates to obtain an article priced at 1d. whilst the other is operated to obtain an article priced at 2d.

To operate the machine, the user first inserts a sufficient number of appropriate coins into the machine so that they fall into the coin chute 1. He then operates one or other of the master switches 18 according to the goods he requires and if the required number of coins is present in the chute this causes a circuit to be closed from the battery or other source of current through the appropriate goods ejecting or releasing coil 20, switch 18, coil 10 and series connected coin operated switches and through the electromagnet 4 of the coin platform back to the source. This causes the coin supporting platform 3 to move aside so as to allow coins to fall from the chute into the cash box or other receiver. At the same time the electromagnet 10 is energised so that any additional coins which may be present in the chute over and above those required are held and prevented from falling out of the chute. Current is also supplied to the device 20 for ejecting or releasing the goods.

When the operating circuit is broken, the coin platform 3 returns automatically to its coin stack supporting position and at the same time the electromagnet 10 is de-energised so that any additional coins held in the chute as described above fall onto the platform 3 ready for a further operation of the machine.

In order to allow time for the coins to fall, it is necessary to prevent the return of the coin platform and the release of the coin stack supporting device operated by the electromagnet 10 from taking place too soon after the switch 18 has been operated. For this purpose, a holding relay 200 is connected between each of the electromagnets 10 and the magnet 4 as shown in Figure 5 so that once the operat-

ing circuit has been made it remains closed independently of the coin-operated switches and can be broken only by opening the switch 18. Any suitable known 5 delay-action device may be provided for preventing the switch 18 from opening until sufficient time has been allowed for the fall of the coins in the chute.

For the sake of clearness, only two coin 10 stack supporting devices 10 and only two coin-responsive switches 25 and push-buttons 18 have been shown. It is easy to see however, that the number of the devices 10 could be increased according to 15 the numbers of coins required to be released at one time, the number of switches 25 being, of course, increased accordingly. Also, although only two switches 18 and two goods ejecting or releasing coils 20 20 have been shown, the number of these may be increased.

When employing a battery of coin reception units various of the switches according to certain pre-arranged coin 25 values may be wired in series so that coins in more than one unit must be in position to operate a certain ejector. For example, if a master switch controls a 1/6d. article ejector, then a 1/-d. piece and a 6d. piece 30 must have been inserted in their respective chutes before the ejector circuit is complete.

In a very simple embodiment, there may be a plurality of columns of vendible 35 articles, one column being of one price and the others multiples thereof, e.g. five columns carrying goods valued respectively at 1d., 2d., 3d., 4d., and 5d., and the invention enables any column to be 40 operated by inserting an appropriate number of coins of similar denomination into a single coin reception unit leading from a single slot. The invention also enables the customer to select goods from any two 45 or more columns up to the value of coinage inserted.

In another embodiment of the invention, a plurality of coin reception units is employed, each one being adapted to take 50 coins of denominations differing from those taken by others, e.g. one taking one or more shillings, one taking one or more sixpences and so on, and these are employed in conjunction with a plurality of 55 columns of vendible articles which may be differently priced. To give an example of this embodiment of the invention, the coin reception units may be six in number respectively taking a 2/6d. piece, a 2/-d. 60 piece, a 1/-d. piece, a 6d. piece, 5 separate pennies, and a 1/2d., whilst five columns of goods may be exposed for sale respectively valued at, say, 4/6d., 2/11d., 1/7 1/2d., 6d., and 3 1/2d. per article. The 65 invention enables any article to be pur-

chased by inserting in any coin insertion unit or collection of units appropriate coins totalling the price. The 2/11d. article, for example, would be secured by inserting a 2/-d. piece, a 6d. piece, and 5 70 pennies in their respective units, and the 3 1/2d. article by inserting three pennies in the unit which takes a total up to five pennies, and a halfpenny in the 1/2d. unit.

If the value of articles in a column is 75 changed it is a fairly simple matter to reset or rearrange the machine to work according to the new order. For this purpose appropriate switches of the banks in the coin receptive units are selected 80 according to the total value needed for the article in the particular column and these are re-connected in series with the master switch in order that the electrically-operated discharge mechanism may only 85 work after insertion of the necessary coinage.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be 90 performed, we declare that what we claim is:—

1. A coin reception unit for a coin-controlled vending machine comprising a chute adapted to retain a stack of coins 95 superimposed edgewise and resting on a coin platform at the base thereof; electromagnetic mechanism for displacing the coin platform so as to allow coins to fall; a coin operated switch or switches actuated 100 by coins resting in the chute and arranged to prevent operation of the machine unless a predetermined number of coins is present in the chute and an electromagnetic coin-stack supporting device adapted to be 105 operated when the coin platform is displaced to prevent the fall of any additional coins which may be present in the coin reception unit over and above those required to operate the machine. 110

2. A coin reception unit for a coin-controlled vending machine according to Claim 1, wherein the coin stack supporting device comprises an element adapted to project between two adjacent coins into 115 the chute, and an electromagnet adapted to move the said element into the projecting position.

3. A coin reception unit according to Claim 2 wherein the said element comprises a ball arranged so that the weight of a coin is sufficient to push the ball aside and thus allow the coin to fall when the electromagnet is de-energised. 120

4. A coin reception unit according to 125 any of the preceding Claims wherein each coin operated switch comprises electrodes which are actuated by a feeler arm on a fulcrum located in the path of the coins and arranged so that the electrodes dip 130

into mercury wells when the feeler arm is actuated by a coin.

5. Apparatus according to any of the preceding Claims wherein a number of customer-operated master switches are provided for operating the mechanism, these switches being connected so that each switch controls a circuit in which the coin platform controlling device is connected in series with a goods ejecting or releasing device and with one or more of the coin controlled switches and with one of the coin stack supporting devices.

6. Apparatus according to Claim 5 wherein a self holding relay is associated with each of the circuits controlled by the master switches so as to delay de-energisation of the coin platform and coin stack

supporting devices for a length of time sufficient to allow the coins to fall.

7. Coin-controlled vending apparatus comprising coin reception mechanism and electrical apparatus arranged to operate goods ejecting or releasing mechanism only when sufficient coins are present in the coin reception mechanism and for causing the appropriate number of coins to be transferred from the coin reception apparatus to a till or receptacle substantially as described and as illustrated in the accompanying drawings.

Dated this 23rd day of July, 1942.

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Fig.1.

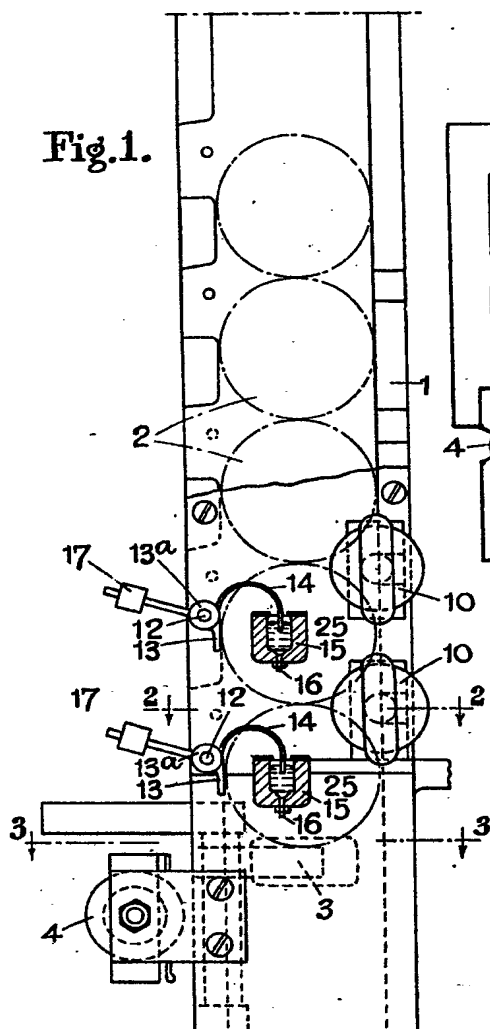


Fig.3.

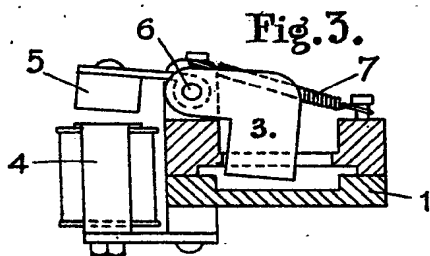


Fig.5.

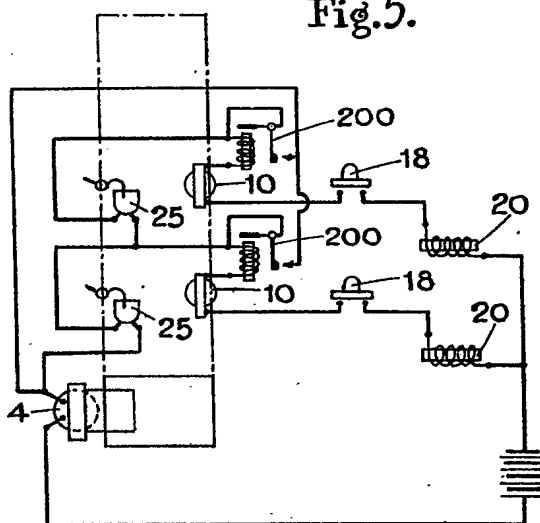


Fig.4.

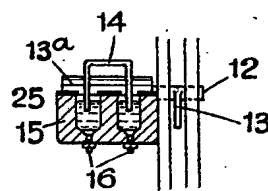
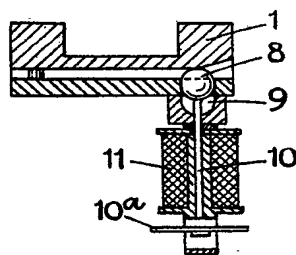


Fig.2.



[This Drawing is a reproduction of the Original on a reduced scale.]